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Original

Urban detection using Decision Tree classifier: a case study / Steffenino, Sara; Angeluccetti, Irene; Disabato, Franca. - ELETTRONICO. - (2013), pp. 293-302. (Intervento presentato al convegno 33rd EARSeL Symposium 2013 - Towards Horizon 2020: Earth Observation and Social Perspectives tenutosi a Matera (IT) nel 3-8 June 2013).

Availability:

This version is available at: 11583/2508705 since:

Publisher:

EARSeL - European Association of Remote Sensing Laboratories

Published

DOI:

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Urban detection using Decision Tree classifier: a case study

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Abstract. This work constitutes a first step towards the definition of a methodology for automatic urban extraction from medium spatial resolution Landsat data. Decision Tree is investigated as classification technique due to its ability in establishing which is the most relevant information to be used for the classification process and its capability of extracting rules that can be further applied to other inputs. The attention was focused on the evaluation of parameters that better define the training set to be used for the learning phase of the classifier since its definition affects all the next steps of the process. Different training sets were created by combining different features, such as different level of radiometric pre-processing applied to the input images, the number of classes considered to train the classifier, the temporal extent of the training set and the use of different attributes (bands or spectral indexes). Different post-processing techniques were also evaluated. Classifiers, obtained by the generated training sets, were evaluated in two different areas of Piedmont Region, where the official regional cartography at scale 1:10000 was used for validation. Accuracies round 81% in the Torino case study and around 96%-97% in Asti case study were reached, thanks to the use of indexes such as NDVI and NDBBBI and the use of post-processing such as majority filtering that allowed enhancing classifier performances.